

REMARKS

Claims 1-12 remain pending in the application. Claims 1 and 10 have been amended and claims 11 and 12 are newly added.

Reconsideration of the rejections and allowance of the pending application in view of the foregoing amendments and following remarks are respectfully requested.

In the Office Action of November 19, 2003, claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto, U.S. Patent No. 6,593,965 in view of Tsang et al., U.S. Patent No. 5,900,623 (hereinafter Tsang). This rejection is respectfully traversed.

Independent claim 1 has been amended to more clearly distinguish over the applied prior art references by reciting that the thinned pixel data are uniformly distributed. No new matter is believed to be introduced by the present amendment. In this regard attention is directed to the description at page 12, line 14-page 13, line 21, and Fig. 3.

It is an object of the present invention to provide an image reading device by which the interpolation process and the thinning process are carried out in a reduced time.

To achieve the above-noted object, an image reading device of the present invention, as recited in amended claim 1, includes, inter alia, an imaging device that has photo-diodes and color filters provided on the imaging device. The color filter has color filter elements of a plurality of colors, the photo-diodes generates an original image data

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containing pixel data and each of which corresponds to one of the colors which are arranged in a predetermined distribution. The image reading device further includes a reading processor that reads the pixel data from the imaging device, a thinning processor that thins out some of the pixel data to generate a thinned image data. The thinned pixel data are uniformly distributed and colors of the thinned pixel data are arranged in the predetermined distribution. The image reading device further includes an interpolation processor that performs an interpolation process on the thinned image data to generate an interpolated image data for each of the colors.

Applicant respectfully submits that the references relied upon in the rejections under 35U.S.C. 103(a), considered singly or in any proper combination, do not disclose such a combination of features. The primary reference Miyamoto refers to and is concerned specifically with RGB filter matrices, each of which is made up of four neighboring elements, that are lined up. To generate a horizontally and vertically image reduced by half in each direction, each group of four neighboring elements is filtered (thinned out) into the half the original number, and the resulting half is then read out. Each of the four groups of pixel data enclosed by lines in Fig. 3 is then stored in the data buffer 3. See, column 3, lines 55-63.

On the contrary, in the present invention, as set forth above, the thinning processor thins out some of the pixel data such that the thinned (i.e., remaining) pixel data are

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uniformly distributed. According to the description in page 12 line 14- page 13, line 21, the thinned data can be, as a non-limiting example only $R_{m,n}$, $G_{m+3,n}$, $R_{m+6,n}$, $G_{m,n+3}$, $B_{m+3,n+3}$, $G_{m+6,n+3}$, $R_{m,n+6}$, $G_{m+3,n+6}$, $R_{m+6,n+6}$ etc. in Fig. 3. In other words the thinned pixel data is not enclosed by the broken lines P3.

Miyamoto does not at least disclose this feature in the recited combination. On the contrary, the pixels displayed on a LCD (i.e., thinned pixel data) are not uniformly distributed, but are arranged to form a group consisting of four adjacent pixels as disclosed in Fig. 3.

Thus, Miyamoto does not render the presently claimed invention unpatentable.

The secondary reference Tsang is directed to a active pixel sensors and, particularly to an active pixel sensor design that realizes in a single chip fabricated using standard CMOS processes image capturing and various signal processing functions. An application of the sensors would be in a single chip CMOS camera. Tsang also does not teach that the thinned pixel data are uniformly distributed. Therefore, Tsang does not overcome the deficiencies of Miyamoto.

Thus, even assuming, arguendo, that the teachings of Miyamoto and Tsang can be properly combined, the asserted combination of Miyatomo and Tsang would not result in the invention as recited in amended claim 1.

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In the Official Action claim 10 is rejected under 35 U.S.C. 102(e) as being anticipated by Miyamoto. This rejection is also respectfully traversed.

Independent claim 10 has also been amended to more clearly distinguish over the applied prior art reference by further reciting that the thinned pixel data are uniformly distributed.

Thus, for at least the same reasons set forth above, Miyamoto does not anticipate the present invention.

In the Official Action the specification has been objected to because of the title of the invention is not descriptive.

The title of the invention has been amended to be more descriptive.

Claims 11 and 12 have been added to reinstate the claims that were canceled to delete multiple dependency in the Preliminary Amendment filed on November 30, 1999.

Independent claims 1 and 10 are now in condition for allowance in view of the above-noted remarks. Dependent claims 2-9, 11 and 12 are also submitted to be in condition for allowance in view of their dependence from the allowable base claims and also at least based upon their recitations of additional features of the present invention.

It is respectfully requested, therefore, that the rejections under 35 U.S.C. 103(a) and 35 U.S.C. 102(e) be withdrawn.

Based on the above, it is respectfully submitted that this application is now in condition for allowance, and a Notice of Allowance is respectfully requested.

Respectfully submitted,
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